

XXI. *On the Eriogonææ, a Tribe of the Order Polygonaceæ.* By GEORGE BENTHAM, Esq., F.L.S.

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THE genus *Eriogonum* was first established by Michaux in his *Flora Boreali-Americana*, upon a Carolina plant distinguished from other *Polygonaceæ*, not so much by the organs of fructification, which are not very essentially different from those of *Rheum*, as by the involucrate inflorescence and the absence of the *ochrææ*, or sheathing stipules, observable in some shape or other in every other genus of the order. To the single species described by Michaux (*E. tomentosum*), Nuttall and Pursh added two others gathered by the former botanist in the plains of the Missouri (*E. flavum* and *E. pauciflorum*), and Smith in Rees's Cyclopædia described two more brought by Menzies from the coast of California (*E. latifolium* and *E. parvifolium*). These five North American species have now been increased to thirty-three by the discoveries of Mr. Douglass in New California and the North-west district, and of Mr. Nuttall, Dr. Torrey, Mr. Drummond, and others, in the Rocky Mountains, Arkansa territories, and province of Texas; and all are equally distinguished by their involucrate inflorescence and absence of stipulæ, at least to the lower or true cauline leaves. But a considerable difference in habit has induced me not only, at the suggestion of Mr. Brown, to separate generically five species with uniflorous involucre, but, amongst these, to isolate one (*Mucronea*), which has a compressed and bidentate involucre formed of two leaves, instead of a triangular sexdentate one formed of six leaves, as in the other four species (*Chorizanthe*, Br.). The latter genus is further confirmed and augmented by seven species collected in Chili by Macrae, Cuming, Bridges, &c., giving a total of forty species comprised in the three genera.

The whole of these plants have all the essential characters of *Polygonaceæ*, thus stated by Brown (*Prodr.* p. 418):

“*Perianthium* monophyllum, divisum, æstivatione imbricatâ. *Stamina* definita, imo perianthio inserta. *Antherarum* loculi longitudinalitèr dehiscentes. *Ovarium* liberum, monospermum, ovulo erecto. *Styli* vel *stigmata* plura. *Nux* (*achenium*) nuda vel perianthio tecta. *Albumen* farinaceum, rarè subnullum. *Embryo* inversus, sæpè unilateralis. *Plumula* inconspicua.”

Taking the involucrem as the essential character of the *Eriogoneæ*, they will be found also to agree in the following particulars :

Herbæ suffruticesve sæpissimè lanuginosæ. *Folia* caulina alterna, ad basin caulis approximata, cæspitosa vel secus ramos fasciculata, exstipulata, petiolo basi dilatato sæpiùs amplexicanti vel vaginante. *Pedunculi* vel *rami* floriferi terminales, nunc simplices involucre solitario terminali, sæpiùs 2—3-ctomè vel umbellatim ramosi, involucre solitariis glomeratisve intra ramificationes secus ramos vel ad apices sessiles vel pedicellati. *Bractew* vel *folia* ramorum floralium sub ramificationes orta, tot quot rami vel (ramis abortientibus) numerosiora, nunc minuta squamæformia, nunc herbacea at foliis caulinis difformia, sæpissimè sessilia, exstipulata vel rariùs stipulis scariosis aucta. *Involucrem* monophyllum, tubulosum, campanulatum vel subcyathiforme, apice 2—6-dentatum, 1—multi-florum. *Flores* hermaphroditi vel rariùs dioici, in involucre pedicellati, cum bracteolis setaceis sæpè intermixti. *Perianthium* simplex, profundè 6-fidum, laciniis 3 exterioribus, 3 interioribus. *Stamina* 9, basi subcoalita. *Ovarium* triquetrum. *Styli* 3, filiformes. *Stigmata* terminalia, tenuia vel parùm incrassata, capitata. *Achenium* triquetrum vel vix trialatum.

From the above description it will appear that there are considerable differences in habit between *Eriogoneæ* and the rest of *Polygonaceæ*; yet when we observe an approach to the dichotomous or verticillate inflorescence in several *Polygona* (*Aconogonu* and *Cephalophila*) and *Kænigia*; the resemblance between the stipules of *Polygona* (*Aviculariæ*) and those of *Eriogonum angulosum*; the very great analogy between the organs of fructification in *Rheum* and the *Eriogoneæ*, and that even in regard to the involucre, the ochreæform bracts* of many *Polygona* (*Persicariæ*) may be assimilated to the involucre of

* See Meisner, *Monogr. Gen. Polygoni*, p. 22.

Eriogonum vimineum, it will be admitted that the two series cannot be otherwise considered than as forming one natural order. The medical properties of several species of *Eriogonum* (called in America Wild Rhubarb) are also known to have much similarity to those of *Rheum*.

Meisner, in his above-quoted monograph of *Polygonum*, in speaking of the number of parts in the organs of fructification of that genus, follows De Candolle in considering the normal number of stamina to be double that of the lobes of the perianthium, and the several variations observable in the different species to be due to the abortion of stamina only. There appear, however, to be several objections to this theory. It is not probable that in an order varying as much in the number of lobes of the perianthium as in that of the stamina, the number of lobes nevertheless should be constantly normal, whilst there is as constant a reduction of number in the stamina, and in those genera where the flowers are perfectly regular in their arrangement (as in *Rheum*, *Eriogonum*, &c.), the symmetry would be disturbed by the insertion of the stamina requisite to make up the number. I should rather suggest that, in the great mass of *Polygonaceæ*, the normal arrangement of all the parts of the flower is ternary, as follows :

Perianthium double, three external and three internal segments.

Stamina in three rows, of three each, those of the external row alternating with the internal segments of the perianthium, those of the central row opposed to them, and the inner ones again alternating with them. In most cases, however, these three rows are so closely connected as to give the appearance of nine stamina in a single row.

Gynæcium single. Ovarium triangular, with three styles and stigmata.

The different reductions from the above number will be better understood from the accompanying sections, copied chiefly from the plates in Meisner's monograph. Thus in *Rheum* and the *Eriogoneæ* (TAB. XVII. fig. 1.) we have the regular normal state above described. In *Rumex* (TAB. XVII. fig. 2.) the ternary arrangement still prevails, but the central row of stamina being wanting, the total number is reduced to six, whilst the other parts of the flower remain complete. In *Atraphaxis* (TAB. XVII. fig. 3.) the flower is still regular, and the number of stamina, as in *Rumex*, is only six, but the reduction is

owing to a general substitution of the binary for the ternary arrangement; two external and two internal segments of the perianthium, two stamina in each row, two styles and stigmata with a biangular ovarium. In *Kœnigia* (TAB. XVII. fig. 4.) there is a still further although regular reduction; the inner segments of the perianthium and two rows of stamina are wanting, leaving a perianthium with three segments opposed to the angles of the ovarium, three stamina opposed to its faces (occasionally reduced to two), and a triangular ovarium with three styles and stigmata. According to the same principle the *Polygona* will be found to be always irregular, there being a constant contraction of the upper side of the flower (next to the axis of the plant). Thus in the common pentamerous octandrous species, either the upper external segment of the perianthium is wanting, the two upper internal ones are brought close together, and one of their stamina is wanting (TAB. XVII. fig. 5.); or the external segments remaining complete, one of the upper internal ones with one of the corresponding stamina is deficient (TAB. XVII. fig. 6.), the gynæcium in both cases remaining complete; whilst in the hexandrous and pentandrous species (TAB. XVII. fig. 7, 8, 9.) there is a further reduction in the upper internal segments of the perianthium and in the upper stamina, and the gynæcium becomes dimerous, the upper faces of the ovarium with their styles and stigmata being reduced to one.

The flowers of *Calligonum*, where (in the specimens I possess of *C. Pallasii*) the lobes of the perianthium are 5, the stamina 12, and the gynæcium tetramerous, are evidently irregular. Their normal state may possibly be pentamerous, 5 external and 5 internal segments of the perianthium, 15 stamina in three rows of 5 each, and a 5-angular ovarium, with 5 styles and stigmata. In support of this opinion it may be mentioned that Ledebour (*Fl. Alt. ii. 207.*) states that the number of styles varies from 2 to 5: it has long been observed that the number of stamina is also variable, not exceeding 15; and in one of the flowers I opened from my own specimens there were four inner and two outer lobes of the perianthium. The stamina being connected at the base appear in this, as in other *Polygonaceæ*, arranged in a single series.

The following are the leading subdivisions I should propose in the ERIOGONEÆ.

I. Involucrum multiflorum. ERIOGONUM.

Folia ramorum floralium stipulata: § 1. STIPULATA (*E. angulosum*).

Folia omnia exstipulata.

Genitalia pilosa.

Inflorescentia dichotoma: § 2. ERIANTHA (*E. longifolium, tomentosum*).

Inflorescentia umbellata: § 3. UMBELLATA.

* Perianthia villosa: (*E. sphaerocephalum, flavum, crassifolium, cespitosum*).

** Perianthia glabra: (*E. pauciflorum, ovalifolium, stellatum, umbellatum, heracleoides, compositum*).

Genitalia glabra.

Involucra multiflora, sæpiùs glomerata, perianthii lacinia subæquales.

Folia parva, secus ramos fasciculata: § 4. FASCICULATA (*E. parvifolium, fasciculatum*).¹

Folia longè petiolata, ad basin caulis approximata: § 5. LATIFOLIA (*E. oblongifolium, latifolium, auriculatum, nudum, elatum*).

Involucra parva, secus ramos paniculæ 2—3-chotomæ solitaria, perianthii lacinia exteriores acutæ: § 6. MICRANTHA (*E. multiflorum, annuum, strictum, niveum, dichotomum, decumbens, tenellum, vimineum*).

II. Involucrum uniflorum, sexdentatum. CHORIZANTHE.

§ 1. SUFFRUTICOSÆ (Chilenses): (*C. virgata, peduncularis, Macraei, ramosissima, paniculata, vaginata, glabrescens*).

§ 2. HERBACÆ (Californicæ): (*C. staticoides; Douglasii, membranacea, pungens*).

III. Involucrum uniflorum, bidentatum. MUCRONEA (*M. Californica*).

1. ERIOGONUM (*Mich.*).

Involucrum tubulosum, campanulatum vel cyathiforme, vix angulatum, subæqualitèr 6-dentatum, multiflorum. *Receptaculum* bracteolis intra pedicellos instructum. *Perianthia* exserta, profundè 6-fida.

§ 1. STIPULATA. *Folia caulina nuda, ramorum floralium stipulata.*

1. *E. ANGULOSUM*, ramis floriferis erectis dichotomis vel verticillatim ramosis foliosis, foliis inferioribus alternis petiolatis exstipulatis, ramorum floralium oppositis verticillatisve basi stipulatis, omnibus oblongo-linearibus subtùs vel utrinque lanuginosis demùm ramisque glabratis, involucris numerosis parvis pedicellatis hemisphæricis glabriusculis. TAB. XVIII. fig. 1.

California. *Douglas.* (v. s.)

This is in many respects a very remarkable species. The lower leaves are collected at the bottom of the stem, and resemble in form those of *E. heracleoides*, *flavum*, &c., and like them have no stipules. The mode of ramification of the flowering branches is also upon the same principle as in other *Eriogona* (although the ramifications commence from the base of the stem), but the leaves, which are placed under the branches, corresponding in number to them, have at the basis of each of them a pair of brown scariose stipules, not forming a sheath round the stem as in most *Polygonaceæ*, but connate at their base *outside* the leaves, and loose at the apex, so as to resemble in some measure the stipules of the *Polygona Avicularia*. The flowering branches are remarkably angular, about a foot high; the peduncles slender, and about half an inch long; the heads of flowers of the form of those of *Galinsogea parviflora*, but smaller. The little bracts inside the involucre are dilated at the apex, membranaceous on the edge, and bear long woolly hairs on their outer surface. The perianth, ovarium and stamina are glabrous. In some, especially the dichotomous specimens, one pedicel at the axis of each ramification bears only a small abortive involucre.

§ 2. ERIANTHA. *Folia omnia exstipulata. Genitalia pilosa. Inflorescentia dichotoma.*

2. *E. LONGIFOLIUM* (*Nutt. in Trans. Amer. Phil. Soc.* v. 164.), caule erecto basi folioso, foliis oblongo-linearibus basi longè angulatis subtùs albo-tomentosis, superioribus parvis, paniculâ amplâ 2—3-chotomè ramosissimâ, bracteis minutis, involucris solitariis pedicellatis campanulatis multifloris perianthiisque extùs lanatis.

Arkansa. *Nuttall.* Texas. *Drummond.* (v. s.)

Caules stricti, plùs minùsve tomentosi, elati. *Folia* inferiora cæspitosa, 3—4-pollicaria, suprâ mollitèr villosa, superiora remota, solitaria vel subfasciculata, ramorum floralium minuta, bracteæformia. *Rami paniculæ* et *pedicelli* rigida. *Bracteæ* subulatæ, glabriusculæ. *Ovarium* villosissimum. *Stamina* ferè glabra.

Nuttall's specimens are much more woolly, and the panicle much larger than in Drummond's; but both appear to belong to the same species.

3. *E. TOMENTOSUM* (*Mich. Fl. Bor. Amer.* i. 246. t. 24.), foliis ad basin caulis approximatis spathulato-obovatis oblongisve subtùs lanatis, ramis floriferis 2—3-chotomè ramosis lanatis ternatim verticillatimve foliosis, involucris solitariis sessilibus campanulatis rufo-lanatis laxè multifloris, perianthiis extùs lanatis.

Carolina and Georgia. *Michaux, Fraser.* (v. s.)

Species habitu et inflorescentiâ distinctissima. *Lana* in foliorum paginâ inferiore ramis involucris perianthiisque densa, sæpiùs rufescens. *Folia* ramorum floralium ovata, obovata vel oblonga. *Involucra* alia in dichotomiis vel secus ramos sessilia, alia terminalia, subcyathiformia. *Bracteolæ* setacæ, densè plumosæ. *Perianthia* longiusculè exserta, laciniis anterioribus longioribus. *Filamenta* basi et ovarium apice pilosa. *Flores* (sec. *Mich.*) candicantes.

- § 3. *UMBELLATA.* *Folia omnia exstipulata. Genitalia pilosa, filamenta prope basin, ovarium apicem versus. Inflorescentia umbellata, pedunculo (sæpè scapiformi) apice umbellam simplicem vel duplicem pluri-radiatam, nunquàm in capitulum globosum contractam vel ad involucrum solitarium reductam, gerente.*

4. *E. SPHÆROCEPHALUM* (*Dougl. MSS.*), caule ramoso folioso, foliis fasciculatis verticillatisve oblongis basi angulatis subtùs albo-lanatis, pedunculis subsimplicibus, involucreo subsolitario latè campanulato tomentoso multifloro, perianthiis extùs sericeo-pilosis.

Columbia river. *Douglas.* (v. s.)

Fruticulus irregularitèr ramosus. *Folia* ad ramificationes sæpiùs fasciculata, petiolis basi dilatatis imbricatis, in ramis verticillata vel pauca remota

alterna. *Involucra* rariùs bina, brevità pedunculata, sæpiùs solitaria (ramis cæteris umbellæ abortientibus). *Flores* in involuero numerosissimi, exserti, capitulum globosum formantes. *Perianthia* flava (?) omninò *E. flavo* similia, at minùs villosa.

5. *E. FLAVUM* (*Nutt. in Fras. Catal.*), foliis ad basin caulis approximatis spatulato-obovatis oblongisve subtùs vel utrinque albo-lanatis, pedunculo apice brevità umbellato, involucris ad apices radiorum solitariis latè campanulatis lanatis multifloris, perianthiis sericeo-villosis.

E. sericeum, Pursh, Fl. Amer. Sept. i. 277.

Missouri. *Nuttall*. Interior of North-west America. *Douglas*. (*v. s.*)

Habitu et inflorescentiâ *E. umbellato*, floribus *E. sphaerocephalo* affine. *Pedunculus* semipedalis, vel parùm longior. *Umbella* 4—8-radiata. *Perianthia* longiusculè exserta, basi attenuata, cum pedicellis densè sericeo-villosa, flava: *laciniæ* interiores post anthesin exterioribus longiores.

6. *E. CRASSIFOLIUM*, caule brevissimo incrassato vaginis foliorum villosissimis oblecto, foliis radicalibus petiolatis oblongis basi longè angustatis crassis suprâ tomentoso-pubescentibus subtùs albo-lanatis, scapo apice brevità umbellato, involucris sessilibus vel ad apices radiorum solitariis campanulatis lanatis multifloris, perianthiis sericeo-villosis.

Rocky Mountains. *Drummond*. (*v. s.*)

Habitu *E. cæspitoso* affine, sed duplò major. Ab *E. flavo* habitu diversum. *Rami* steriles nulli (?). *Radix* crassa, rubens. *Folia* omnia radicalia, vaginis dilatatis imbricatis pilis longis albis omninò oblectis. *Scapus* subsemipedalis, nudus. *Bracteæ* sub umbellâ oblongo-lineares, foliaceæ. *Involucra* crassiuscula, densè lanata. *Flores* *E. flavi*.

7. *E. CÆSPITOSUM* (*Nutt. in Journ. Acad. Nat. Sc. Philad.* vii. 50. t. 8. f. 2.), caule brevissimo vaginis foliorum glabriusculis oblecto, foliis radicalibus oblongo-linearibus basi longè angustatis suprâ levità subtùs densè albo-tomentosis, scapo apice brevità umbellato, involucris sessilibus vel ad apices radiorum solitariis campanulatis lanatis.

Rocky Mountains. *Nuttall*, *Drummond*. (*v. s.*)

Herba parvula, densè cæspitosa. *Radix* crassa, rubens. *Foliorum* limbus vix semipollicares. *Scapus* nunc, ut in icone Nuttallianâ, vix bipollicaris, nunc 4—5-pollicaris, laxè tomentosus. *Bracteæ* sub umbellâ oblongæ, floribus breviores. *Perianthia* longiusculè exserta, laciniis interioribus vix longioribus.

8. *E. PAUCIFLORUM* (*Pursh, Fl. Amer. Sept.* ii. 735.), foliis ad basin caulis approximatis oblongo-linearibus subtùs vel utrinque albo-lanatis, pedunculis apice capituliferis, involucris plurimis sessilibus tubulosis tomentosis paucifloris, perianthiis glabris.

E. parviflorum, Nutt. Gen. i. 161.

Upper Louisiana. *Bradbury.* (*v. s.*)

Statura pusilla. *Caulis* basi cæspitosus, sublignosus. *Pedunculus* terminalis, 2—4-pollicaris. *Capitulum* parvum, densum, involucris circitè octo. *Perianthia* vix exserta. *Genitalia* pilosa (?).

9. *E. OVALIFOLIUM* (*Nutt. in Journ. Acad. Nat. Sc. Philad.* vii. 50. t. 8. f. 1.), foliis ad basin caulis approximatis subrotundo-ovalibus basi in petiolum angustatis utrinque densè albo-lanatis, involucro ad apicem pedunculi solitario globoso multifloro vel paucis sessilibus, perianthiis glabris vel basi vix pubescentibus.

Source of the Missouri. *Nuttall.* Interior of North-west America. *Douglas.* (*v. s.*)

Suffrutex humilis, basi ramosissimus, cæspitosus. *Folia* vix cum petiolo semipollicaria. *Pedunculus* 3—4-pollicaris, cano-lanatus, ad medium verticillo foliorum oblongo-linearium instructus. *Capitulum* *E. sphærocephali* sed perianthia ferè glabra.

10. *E. STELLATUM*, foliis ad basin caulis approximatis ovalibus basi in petiolum longè angustatis suprâ glabriusculis subtùs canescentibus, pedunculo apice simpliciter vel bis umbellato, involucris in umbellulâ paucis villosulis sex-fidis, laciniis lanceolatis tubo longioribus reflexo-patentibus, perianthiis glabris.

Interior of North-west America. *Douglas.* (*v. s.*)

Habitus ferè *E. umbellati*, sed humilior, et minùs tomentosum. *Folia* latiora. *Bracteæ* sub umbellâ umbellulise oblongæ, glabriusculæ. *Lacinie* involucrorum flores subsuperantia. *Perianthia* brevità pedicellata.

11. *E. UMBELLATUM* (*Torrey in Ann. Lyc. Nat. Hist.* ii. 241.), foliis ad basin caulis approximatis oblongo-linearibus subtùs vel utrinque albo-lanatis, pedunculo apice umbellato, involucris ad apices radiorum solitariis latè campanulatis lanatis multifloris dentibus tubo brevioribus, perianthiis glabris. TAB. XVIII. fig. 2.

Interior of North-west America. *Douglas*. Rocky Mountains. *Torrey*. (v. s.)

Rami steriles sub insertionem pedunculi plurimi, subverticillati, breves, apice fasciculatim vel verticillatim foliosi. *Pedunculi* spithamæi, infra umbellam nudi. *Bracteæ* sub umbello oblongæ. *Radii umbellæ* constantè simplices, 4—8, uti involucra lanati. *Perianthia* exserta, flava (?), laciniis inter se subæqualibus. *Stigmata* crassiuscula.

12. *E. HERACLEOIDES* (*Nutt. in Journ. Acad. Nat. Sc. Philad.* vii. 49.), foliis ad basin caulis approximatis spathulato-oblongis subtùs albo-lanatis, pedunculo elongato apice biumbellato, involucris in umbellulâ plurimis pedicellatis latè campanulatis lanatis multifloris, perianthiis glabris.

Sources of the Missouri. *Nuttall*. Columbia river above the Kettle Falls. *Douglas*. (v. s.)

Ab *E. umbellato* differt staturâ elatiore, foliis latioribus et umbellis compositis. *Pedunculus* scapiformis, sæpiùs ultrapedalis, verticillis foliorum uno alterove instructus. *Flores* omninò *E. umbellati*.

13. *E. COMPOSITUM* (*Dougl. MSS.*), foliis ad basin caulis approximatis longè petiolatis ovatis basi rotundatis cordatisve suprâ demùm glabratis subtùs densè albo-lanatis, pedunculo longissimo nudo apice brevità biumbellato, involucris brevità pedicellatis campanulatis multifloris. TAB. XVII. fig. 10.

Columbia river. *Douglas*. (v. s.)

Habitu et foliis *E. latifolio* affine, inflorescentiâ ad *Umbellatorum* sectionem referendum, floribus inter *Umbellata* et *Micrantha* medium. *Petioli* basi vaginautes, extus villosissimi, 2—4-pollicares, limbo 1—1½-pollicari. *Pe-*

dunculus scapiformis ultrapedalis, in exemplaribus cultis folio sæpè instructus. *Bracteæ* sub radiis umbellæ lineares, oblongæ, vel (in exemplis cultis) dilatato-ovatæ. *Radii umbellæ* $1\frac{1}{2}$ —3-pollicares, umbellulorum vix semipollicares, villosuli. *Flores* majores quàm in *E. latifolio*. *Genitalia* minùs pilosa quàm in præcedentibus. *Perianthia* post anthesin aucta, lacinia interioris elongatæ obovatæ, exteriores breviores latiores, marginibus membranaceis crispis.

§ 4. FASCICULATA. *Folia omnia exstipulata. Genitalia glabra. Involucra multiflora sæpiùs in capitulis glomerata. Capitula solitaria vel secus ramos pedunculi plura. Folia parva secus ramos fasciculata. Perianthia glabra.*

14. *E. PARVIFOLIUM* (*Sm.! in Rees Cycl.*), fruticosum, foliis brevissimè petiolatis ovatis margine revolutis undulatis subtùs lanatis, involucris sublanatis.

Upper California. *Menzies, Douglas. (v. s.)*

Folia $\frac{1}{4}$ — $\frac{1}{2}$ -pollicaria, basi truncata vel subcordata. *Pedunculi* omnes simplices vel terminalis ramosus. *Capitula* pauca lateralia et terminalia, fructifera rubescentia. *Bracteæ* sub capitulo paucæ, parvæ, ovatæ vel oblongæ. *Involucra* in capitulo plurima, sessilia, tubuloso-campanulata. *Bracteolæ* intra involucrum plumosæ. *Perianthii lacinie* inter se subæquales.

15. *E. FASCICULATUM*, fruticosum, foliis oblongo-ellipticis linearibusve basi angustatis margine revolutis glabris vel subtùs tenuitèr albo-tomentosis, involucris glabriusculis.

Upper California. *Menzies, Douglas. (v. s.)*

Folia $\frac{1}{2}$ — $\frac{3}{4}$ -pollicaria, demùm glabra. *Pedunculi* longiores quàm in *E. parvifolio*, terminalis sæpiùs umbellifer, radiis 2—3 inæqualitèr elongatis, 1—2 brevissimis vel uno alterove intra radios sessilibus. *Bracteæ* sub capitulis numerosæ, oblongo-lineares. *Bracteolæ* intra involucra minutissimæ. *Involucra et flores E. parvifolii.*

§ 5. *LATIFOLIA*. *Folia omnia extipuluta. Genitalia glabra (vel filamenta rariùs basi vix pubescentia). Involucra multiflora, sæpiùs in capitulis glomerata.—Suffrutices. Folia longè petiolata, ad basin ramorum approximata. Pedunculi scapiformes, elongati, subnudi, apice irregularitèr 2—3-chotomè vel subumbellatim ramosi, rariùs simplices. Perianthia glabra.*

16. *E. OBLONGIFOLIUM*, foliis oblongo-ovatis basi angustato-rotundatis suprâ villosulis subtùs albo-lanatis, petiolis basi dilatatis nudis, capitulis lateralibus terminalibusque, involucris in capitulo 3—6 sessilibus campanulatis glabris vel apice vix lanatis multifloris.

Upper California. *Douglas. (v. s.)*

Ab *E. latifolio* diversum videtur foliorum formâ, involucris minoribus ferè glabris, et bracteolis brevioribus vix plumosis. Pedunculi rarissimè simplices, sæpiùs apice umbellati.

17. *E. LATIFOLIUM* (*Sm.! in Rees Cycl.*), foliis ovatis basi rotundatis vel subcordatis suprâ arachnoideo- subtùs densè lanatis, petiolis basi dilatatis nudis, capitulis in pedunculo solitariis vel paucis, involucris in capitulo 2—6 sessilibus campanulatis lanatis multifloris, bracteolis demùm exsertis densè plumosis.

E. arachnoideum, *Eschsch.! in Mem. Acad. Sc. Petrop. vol. 10.*

Upper California. *Menzies, Eschscholtz, Chamisso, Douglas. (v. s.)*

Habitus ut in speciebus affinibus valdè variabilis, sed (præter foliorum formâ) involucris albo-lanatis et bracteolis longis rufo-plumosis facilè recognoscendum. Pedunculi etiam sæpiùs breviores simplices et capitula majora. Exemplaria *Eschscholtziana* non diversa videntur à *Menziesianis*.

18. *E. AURICULATUM*, foliis ovatis margine undulatis basi rotundatis vel subcordatis crassiusculis suprâ arachnoideo-lanatis demùm glabris subtùs albo-lanatis, petiolis basi sæpiùs auriculato-dilatatis, ramis pedunculi glaucescentis pluribus rigidis, capitulis lateralibus terminalibusque, involucris in capitulo 3—4 sessilibus campanulatis glabris.

Upper California. *Douglas. (v. s.)*

Ab *E. latifolio* differt imprimis pedunculo elatiore ramosiore glaucescente

nec ad ramificationes lanato, ramis crassioribus rigidioribus, capitulis minoribus lanâ ferè omninò destitutis. Bracteolæ breviter plumosæ.

19. *E. NUDUM* (*Dougl. MSS.*), foliis ovatis margine undulatis basi rotundatis vel subcordatis suprâ arachnoideo-lanatis demùm glabris subtùs albo-lanatis, pedunculo 2—3-chotomè paniculato, capitulis lateralibus terminalibusque involucris in capitulo 1—3 sessilibus tubuloso-campanulatis glabris, bracteolis vix plumosis.

E. arachnoideum. *Hook. et Arn. Bot. of Beech. Voy. p.* 158. non *Eschsch.*

Plains of the Multoonah. *Douglas. California. Beechey. (v. s.)*

Ab *E. latifolio* differt glabritie et inflorescentiâ. Bracteæ sub involucris et ramificationibus breves, ovatæ. Involucris dentes breves, obtusi. Bracteolæ setaceæ, vix exsertæ. Perianthii laciniæ subæquales.

20. *E. ELATUM* (*Dougl. MSS.*), foliis amplis oblongis undulatis suprâ villosulis subtùs velutinis, involucris glomeratis pedicellatis tubuloso-campanulatis glabris.

Columbia river. *Douglas. (v. s.)*

Folia inferiora multò majora quàm in cæteris speciebus (4—6-pollicaria) et vix subtùs canescentia. *Pedunculus* ut in præcedentibus scapiformis, sesquipedalis, ramis 2—3-chotomis vel irregularitèr umbellatis, at involucri glomeratim pedicellata, nec capitata. *Pedicelli* inæquales. *Bracteæ* sub involucris parvæ, ovatæ. *Bracteolæ* intra involucri setaceæ, glabræ. *Perianthia* breviter exserta, glabra, laciniis inter se subæqualibus. *Genitalia* glabra.

- § 6. MICRANTHA. *Folia omnia exstipulata. Genitalia glabra (vel filamenta basi pilis paucis donata). Involucri solitaria, intra ramificationes secus ramos vel ad apices ramorum pedunculi 2—3-chotomi disposita. Perianthia glabra, laciniis exterioribus majoribus. Species pleræque (an omnes?) dioicæ vel polygamæ.*

21. *E. MULTIFLORUM*, caule erecto elato ramoso, foliis sessilibus oblongo-lanceolatis undulatis suprâ arachnoideo-subtus albo-lanatis pedunculo apice 2—3-chotomè ramosissimo corymboso, involucris glabriusculis.

Texas. *Drummond.* (v. s.)

Caulis cum pedunculo ultrà sesquipedalis, laxè arachnoideo-tomentosus. *Folia* acuta, bipollicaria, inferiora longiora. *Pedunculi* semipedales et longiores subnudi. *Rami* paniculæ divaricati. *Involucra* parva, numerosa, pedicellata, campanulata. *Bracteolæ* paucæ, plumosæ. *Perianthia* brevità exserta, parva, glabra, lacinia exteriora post anthesin membranaceo-dilatata, rotundata, basi cordata, interiora parva oblongo-lineares. *Filamenta* (in exempl. meo fæmineo sterilia) basi pilis paucis longis uti lacinia interiora perianthii lanata. *Ovarium* glabrum.

22. *E. ANNUUM* (*Nutt. in Trans. Amer. Phil. Soc.* v. 164.), erectum, annuum, foliis oblongis basi angustatis, pedunculo albo-lanato apice 2—3-chotomè ramoso, involucris campanulatis niveo-lanatis multifloris.

Arkansas. *Nuttall.* Rocky Mountains. *Torrey.* (v. s.)

Caules subsimplices, pedales et ultrà. *Folia* ferè *E. nivei*, ad axillas nonnunquam fasciculata. *Pedunculi* semipedales, terminales, nudi. *Panicula* multiflora, corymbosa. *Bracteæ* minutæ. *Involucra* pedicellata. *Bracteolæ* piliformes, paucæ. *Perianthia* brevità exserta, parva, glabra, submembranacea; lacinia exteriora ovata, basi angustata, interiora oblonga. *Filamenta* basi subpilosa.

23. *E. STRICTUM*, suffruticosum, foliis parvis oblongo-ovatis basi in petiolum longè angustatis subtùs vel utrinque albo-lanatis, pedunculis strictis gracilibus subglobosis, involucris parvis sessilibus terminalibusque paucifloris glabriusculis, dentibus brevissimis subæqualibus.

Columbia river. *Douglas.* (v. s.)

Suffrutex basi cæspitosus, densè foliosus. *Pedunculi* scapiformes, juncei, pedales et ultrà, basi simplices, nudi, à medio 2—3-chotomi, ramis omnibus strictis rigidis erectis tenuibus. *Bracteæ* parvæ, lineares. *Involucru* pauca, secus ramos sessiles, pleraque ad apices ramorum terminalia, vix lineam longa. *Perianthia* exserta, laciniis exterioribus demùm valdè auctis.

24. *E. NIVEUM* (*Dougl. MSS.*), suffruticosum, foliis oblongis basi angustatis, pedunculoque albo-lanatis, bracteis patentibus, involucris tenuibus niveis paucifloris sessilibus, dentibus alternis minutis.

Valleys of the Blue Mountains. *Douglas. (v. s.)*

Suffrutex basi cæspitosus, foliosus. *Folia* ferè *E. flavi*. *Pedunculi* scapiformes, pedales, basi simplices, nudi vel rariùs verticillo foliorum infra ramificationes instructi, apice ramosi, ramis gracilibus. *Bracteæ* subfoliaceæ, oblongo-lineares, sub involucrio plerumque floribus vix breviores recurvopatientes. *Involucra* vix sesquilineam longa, tubulosa, densè lanata, dentibus tribus minutis, tribus parùm longioribus patentibus. *Bracteolæ* intra involucrum setaceæ, nudæ.

25. *E. DICHOTOMUM* (*Dougl. MSS.*), suffruticosum, foliis oblongis basi angustatis pedunculoque albo-lanatis, bracteis brevibus appressis, involucris crassiusculis densè lanatis plurifloris sessilibus, dentibus brevibus subæqualibus.

Columbia river. *Douglas. (v. s.)*

Affine *E. niveo*, sed rigidus, strictus. *Bracteæ* involucrio dimidiò breviores, appressæ. *Involucra* tubulosa, duplò majora quàm in *E. niveo*. *Flores* exserti, magnitudine ferè *E. compositi*. *Filamenta* basi pilis paucis donata. *Ovarium* glaberrimum.

26. *E. DECUMBENS*, suffruticosum, foliis ovatis longè petiolatis utrinque canotomentosis, pedunculi ramis flexuosis floccoso-lanatis, bracteis involucrum æquantibus patentibus, involucris crassiusculis densè lanatis plurifloris sessilibus, dentibus recurvopatientibus alternis minutis.

Columbia river. *Douglas. (v. s.)*

Rami foliiferi elongati, duri, densè tomentosi. *Folia* pollicaria, petiolo 1—2-pollicari. *Bracteæ* inferiores oblongæ, foliaceæ, ultrà pollicares, superiores lineares. *Involucra* formâ ferè *E. nivei*, magnitudine *E. dichotomi*. *Flores* magnitudine *E. compositi*. Species habitu distinctissima.

27. *E. TENELLUM*, “caule nudo dichotomo gracili glaberrimo, ramis elongatis apice fasciculum florum gerentibus, floribus minutissimis, calycis laciniis subrotundis obtusis glabris, foliis ovatis subcordatis subtùs (junioribus utrinque) niveo-tomentosis suprâ pubescentibus.”—*Torrey in Ann. Lyc. Nat. Hist.* ii. 241.

Rocky Mountains. *Torrey*.

28. *E. VIMINEUM* (*Dougl. MSS.*), annuum, foliis subradicalibus petiolatis ovatis subtus tomentosus, pedunculis scapiformibus divaricato-ramosissimis apice involucrisque glaberrimis.

Columbia river. *Douglas*. (*v. s.*)

Pedunculi scapiformes, complures, basi sublanati, erecti, 6—8-pollicares. *Rami* tenues, virgati. *Involucra* tenuia, cylindrica, sessilia, dentibus brevibus obtusis subæqualibus. *Perianthia* breviter exserta, laciniæ exteriores per anthesin patulæ, obovatæ, interiores erectæ dimidiò angustiores.

II. CHORIZANTHE (*R. Br.*).

Involucrum tubulosum, triangulare, uniflorum, sexdentatum, dentibus nunc inæqualibus, 3 (angulorum) longioribus extimo longissimo, nunc subæqualibus. *Perianthium* involucre inclusum vel vix exsertum.

§ 1. *Suffrutices* (*Chilenses*).

1. *C. VIRGATA*, suffruticosa, foliis ad basin caulis approximatis linearibus utrinque sericeo-villosis, pedunculis elongatis subnudis subsimplicibus tomentosus, cymis in capitulo terminali condensatis, involucris sericeis, dentibus inæqualibus bracteisque subulato-aristatis. TAB. XIX. fig. 1.

Andes of Chili. *Cuming* (*n.* 205.); *Bridges* (*n.* 519.). (*v. s.*)

Caules basi cæspitosi, foliis numerosis, superioribus 3—4-natis verticillatis 6—10 lin. longis basi caulem vaginantibus connatis. *Pedunculi* vel *rami* floriferi erecti, pedales, foliorum verticillis 1—2 instructi. *Involucra* dentes exteriores recurvi. *Flos* in involucre breviter pedicellatus. *Perianthii* laciniæ subæquales, patentés, crenulatæ.

2. *C. PEDUNCULARIS*, suffruticosa, foliis ad basin caulis approximatis oblongo-linearibus utrinque sericeo-villosis, pedunculis elongatis nudis tomentosus, cymis in capitulo terminali solitario condensatis, involucris tomentosus, dentibus 3 minimis, 3 bracteisque lanceolatis muticis.

Andes of Chili. *Cuming* (*n.* 288.). (*v. s.*)

Folia minus conferta et parum longiora quam in *C. virgata*, plerumque alterna, basi dilatato-amplexicaulia. *Pedunculi* demum ferè pedales. *Involucra*

dentés exteriores erecti. *Flos* brevissimè pedicellatus. *Perianthii* laciniæ vix inæquales.

3. *C. MACRÆI*, caule suffruticoso ramoso folioso, foliis linearibus ramisque sericeo-pubescentibus, cymis multifloris in capitulo breviter pedunculato condensatis, involucriis sericeis, dentibus brevissimis inæqualibus bracteisque acutis muticis.

Coquimbo, Chili. *Macrae*. (v. s.)

Suffrutex humilis, ramosissimus. *Folia* alterna, basi pilosa. *Pedunculi* 2—3-pollicares, nunc aphylli, nunc folia 3—4 in verticillo disposita gerentes. *Involucria* minora et minus tomentosa quàm in *C. pedunculari*. *Flos* longè pedicellatus (at non exsertus). *Perianthium* breve. *Laciniæ* interiores exterioribus duplò majores.

4. *C. RAMOSISSIMA*, caule suffruticoso ramosissimo folioso, foliis linearibus ramisque sericeo-pubescentibus, pedunculis trichotomis, cymis laxis, involucriis sericeis, dentibus brevibus inæqualibus acutis muticis.

Baths of Collina, Chili. *Macrae*. (v. s.)

Media inter *C. Macraei* et *C. paniculatam*. *Habitus* prioris à quâ differt cymis laxè trichotomis ad trichotomias foliatis; à *C. paniculatâ* differt involucriis longioribus et inflorescentiâ multò breviorè. *Perianthium* subvillosum.

5. *C. PANICULATA*, caule suffruticoso ramoso folioso, foliis linearibus utrinque ramisque tomentoso-pubescentibus, paniculâ laxè 2—3-chotomâ divaricatâ, cymis paucifloris, involucriis sericeo-tomentosis, dentibus brevibus inæqualibus acutis muticis.

Andes of Chili. *Cuming* (n. 249); *Bridges* (n. 515.). (v. s.)

Caules basi tortuoso-ramosi, foliis alternis basi semiamplexicaulibus. *Paniculae* numerosæ semipedales, foliis sub ramificationibus verticillatis basi connatis. *Involucria* alia in dichotomiis trichotomiisve sessilia, alia ad apices ramorum in cymis 6—12-floris glomerata. *Dentes* crassi subpatentes. *Perianthium* ferè glabrum, laciniis subæqualibus.

6. *C. VAGINATA*, caule suffruticoso ramoso folioso, foliis lanceolatis aristatis

basi dilatato-vaginantibus ramisque sericeo-pilosis, paniculâ dichotomâ, cymis corymbosis, involucris sericeo-pilosis dentibus vix inæqualibus breviter subulato-aristatis.

Valparaiso. *Cuming* (n. 479.); *Bridges*. (v. s.)

Caules basi procumbentes vaginis foliorum omninò obtecti. *Rami* floriferi dichotomi, foliis sæpiùs oppositis basi connatis. *Perianthium* breviter pedicellatum, extùs sericeum, laciniis subæqualibus. In specimine Cumingiano (juniore) folia bractea et involucria omnia subulato-aristata, in Bridgesiano (fructifero) aristæ breviores vel nullæ.

7. *C. GLABRESCENS*, caule suffruticoso humili ramoso folioso, foliis linearibus ramisque parè pilosis vel demùm glabratiss, cymis subcorymbosis, involucris glabris, dentibus subæqualibus subulato-aristatis.

Coquimbo, Chili. *Lord Colchester, Cuming* (n. 904.)*. (v. s.)

Affinis *C. Macraei*, differt staturâ humiliore, glabritie et dentibus involucri. Perianthii laciniæ ferè æquales.

§ 2. *Herbaceæ (Californicæ).*

8. *C. STATICOIDES*, annua, foliis radicalibus petiolatis spathulatis hirsutis, caulibus subnudis erectis 2—3-chotomè ramosis, cymis laxè corymboso-paniculatis, involucris glabriusculis, dentibus inæqualibus subulato-cristatis.

California. *Douglas*. (v. s.)

Habitu ad *Staticem oleæfoliam* vel ferè *S. aristatam* refert. *Folia* radicalia rosulata. *Caules* semipedales, ad dichotomias articulati, bracteas 2—3 breves verticillatas gerentes. *Involucria* fructifera aucta, dentibus valdè inæqualibus. *Perianthium* brevissimè pedicellatum, laciniæ exteriores lanceolatae, interiores majores obovatae.

9. *C. DOUGLASII*, annua, caule erecto 2—3-chotomè ramoso, foliis radicalibus petiolatis spathulatis, caulinis oblongo-linearibus ramisque subsericeo-pilosis, cymis multifloris in capitulo terminali paniculato condensatis, involucris pilosis, dentibus patentibus basi membranaceo-dilatatis apice inæqualitèr subulato-aristatis.

California. *Douglas*. (v. s.)

* A young specimen under the same number appears to be a *Pleurophora*.

Herba semipedalis. *Capitula* florum magnitudine pisi majoris. *Bracteæ* subulatæ dentesque involucri purpurascentia. *Perianthium* sessile; *laciniæ* omnes æquales, oblongo-cuneatæ, apice truncatæ, mucronulatæ.

10. C. MEMBRANACEA, annua, caule erecto subdichotome ramoso, foliis linearibus ramisque laxè lanatis, cymis multifloris in capitulis terminalibus subpaniculatis condensatis, involucris tomentosissimis infundibuliformibus, limbo membranaceo-dilatato, dentibus æqualibus breviter subulato-aristatis. TAB. XVII. fig. 11.

California. *Douglas.* (v. s.)

Herba subpedalis. *Lana caulis* et *foliorum* nivea, tenuis, subdecidua. *Capitula florum* globosa, fructifera iis scabiosarum nonnullarum similia. *Pedicelli* perianthio æquilongi.

11. C. PUNGENS, subherbacea, ramis elongatis diffusis subdichotomis, foliis petiolatis spathulatis ramisque pilosis, cymis multifloris laxè capitatis, capitulis irregulariter paniculatis, involucris pubescentibus, dentibus inæqualibus bracteisque longè subulato-aristatis. TAB. XIX. fig. 2.

California. *Douglas.* (v. s.)

Herba perennis videtur. *Rami* sesquipedales, pilis mollibus patentibus villosi. *Capitula* secus ramos numerosa, multiflora, breviter pedunculata. *Involucri* dentes exteriores uti bracteæ pungentes. *Perianthium* sessile, laciniis æqualibus.

III. MUCRONEA.

Involucrum tubulosum, compressum, uniflorum, bidentatum. *Perianthium* involucri inclusum.

1. M. CALIFORNICA. TAB. XX.

California. *Douglas.* (v. s.)

Herba annua, spithamæa, pilosiuscula, ramis dichotomis divaricatis. *Folia* inferiora petiolata, oblongo-linearia. *Bracteæ* ad dichotomias, et sub floribus amplexicaules, stellato-trilobæ, lobis lato-ovatis apice aristulatis. *Involucra* inferiora in dichotomiis solitaria et sessilia, superiora ad apices ramorum approximata. *Dentes* involucri subulato-aristati, subpungentes, exteriore longiore. *Perianthium* pedicello suo æquilongum, laciniis subæqualibus.

EXPLANATION OF THE PLATES.

TAB. XVII.

- Fig. 1. Arrangement of the floral organs in *Rheum crassinervium*.
2. Ditto in *Rumex alpinus*.
3. Ditto in *Atraphaxis spinosa*.
4. Ditto in *Kænigia islandica*.
5. Ditto in *Polygonum alpinum*.
6. Ditto in *Polygonum Convolvulus*.
7 & 8. Ditto in *Polygonum Persicaria*.
9. Ditto in *Polygonum virginianum*.
10. *Eriogonum compositum*. a. Involucrum. b. Flower. c. Perianthium laid open. d. Pistillum. e. Fruit surrounded by the persistent perianthium. f. Fruit separate. g. Seed. h. Transverse section of the seed.
11. *Chorizanthe membranacea*. a. Involucrum. b. Pericarpium. c. Seed. d. Longitudinal section of ditto.

TAB. XVIII.

- Fig. 1. *Eriogonum angulosum*.
2. *Eriogonum umbellatum*.

TAB. XIX.

- Fig. 1. *Chorizanthe virgata*. a. Involucrum. b. Perianthium.
2. *Chorizanthe pungens*. a. Involucrum. b. The same laid open. c. Perianthium. d. The same laid open, with the stamens. e. Pistillum.

TAB. XX.

- Fig. 1. *Mucronea californica*. a. Involucrum. b. Perianthium.